



Aquatic and semiaquatic bugs (Insecta, Hemiptera, Heteroptera) from Toluviejo Municipality, Sucre Department, Caribbean region of Colombia

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Abstract

We present the results of a survey of the aquatic and semiaquatic bugs (Insecta, Hemiptera, Heteroptera) from the small streams Pechilín, Bobo, Camarón, and Macaján, located in Toluviejo Municipality, Sucre Department, Caribbean region of Colombia. Representatives of 8 families, 20 genera, and 32 species have been collected, of which 11 species are recorded for the first time from Sucre Department, 8 from the Colombian Caribbean region, and 4 from Colombia.

Key words

Aquatic insects; Gerromorpha; Neotropical Region; Nepomorpha; South America.

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Introduction

Colombia is located in the tropical zone of South America and is considered one of the megadiverse countries of the world, which together contain 70% of the global biodiversity (Williams et al. 2001). Five geographic regions are recognized in the country: Caribbean, Andean, Pacific, Orinoquia, and Amazonia (IGAC 1996). Sucre Department, located in the Caribbean region, is divided into 5 subregions: La Mojana, Montes de María, Morrosquillo, Sabanas, and San Jorge. This department shows a considerable number of ecosystems, including mangroves, swamps, and savannas. Toluviejo Municipality is part of the Montes de María subregion and has different

landscapes, such as plains, foothills, hills, and mountains reaching altitudes slightly above 1,000 m.

The Colombian Caribbean region includes remnants of dry tropical forest, one of the least known and most endangered ecosystems in the world (Pizano and García 2014), characterized by a dry season of 3 or more months and deciduous species of plants (Rodríguez-M et al. 2012). This ecosystem is extremely fragmented and is subject to continuous deterioration, mainly due to anthropic activity. Climatic factors such as a very dry season in 2014 and the El Niño phenomenon in 2015–2016 have also had an influence in its loss of integrity. In Sucre Department, many aquatic ecosystems are rapidly deteriorating, which represents a threat to a yet poorly studied fauna.

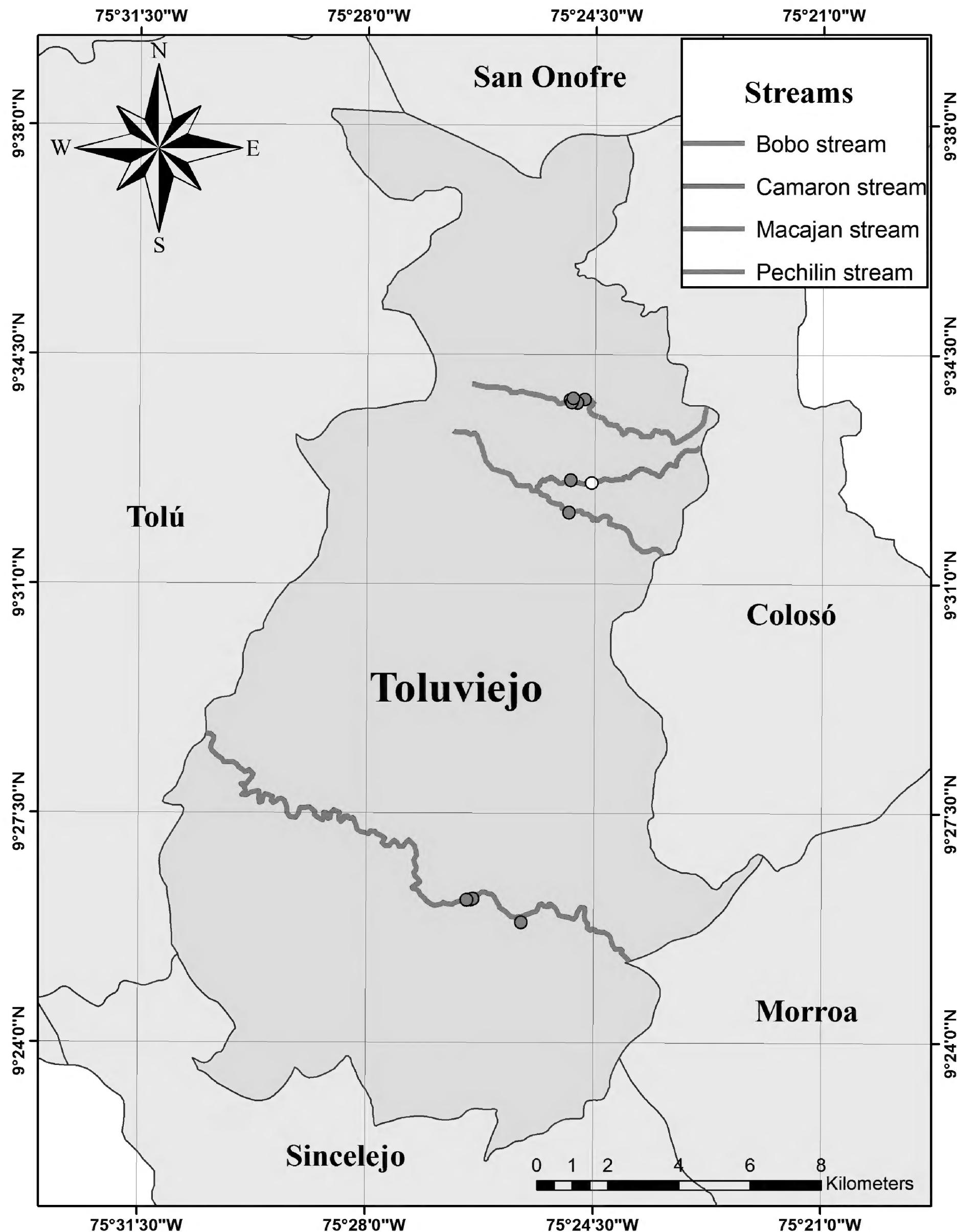


Figure 1. Geographic location of the sampling stations in Toluviejo, Sucre Department, Colombia.

Over 300 species of aquatic and semiaquatic bugs (Hemiptera, Heteroptera) have been recorded from Colombia, but many areas of the country remain largely unexplored, including Sucre Department, where only 15 genera and 21 species have been reported so far (Aristizábal-García 2017). We present here a survey of the

aquatic and semiaquatic bugs from 4 streams located in Toluviejo Municipality, which is an important contribution to our knowledge of the diversity of these insects in the dry tropical forests of Sucre Department and the Colombian Caribbean.



Figure 2. Pechilín Stream, sampling station 1, located near Sincelejo–San Onofre road.



Figure 3. Bobo Stream, sampling station 2.

Methods

Specimens were collected below 70 m of altitude in 4 streams: Pechilín, Bobo, Camarón, and Macaján (Fig. 1), located in Toluviejo Municipality, Sucre, Colombia. Climate in the region is typically tropical, with an average temperature of 28 °C. The dry season extends from April to July, and the rainy season goes from August to December (Aguas et al. 2008). Soils in the area are the result of Tertiary orogeny and of Quaternary alluvial deposits, fluvial-marine and fluvial-lacustrine. The mountain landscape of the Toluviejo formation is constituted by alternating black shale, mica bearing shale and limestone (IGAC 1998).

Pechilín Stream runs through the municipalities of Ovejas, Los Palmitos, Colosó, Morroa, Toluviejo, and Tolú. During the dry season, it shows fairly large areas of backwater (pools) and areas of moderate current (Fig. 2), whereas during the rainy season, the current can be dangerously strong, making sampling impossible. Bobo Stream is located in Macaján Village, about 10 km north of Toluviejo (IGAC, 1996). Many areas of this stream are dry for most of the year, but it also includes permanent or temporary pools (Fig. 3). Both streams above are crossed by the Toluviejo–San Onofre road. Camarón and



Figure 4. Camarón Stream, sampling station.



Figure 5. Macaján Stream, sampling station 1.

Macaján streams run through the rural area of Macaján Village, about 3 km from the road. Camarón Stream is an extremely deteriorated ecosystem, where only small pools can be found (Fig. 4). Macaján Stream (Fig. 5) is also quite deteriorated because of anthropic activities.

Field work happened between February and June of 2014, between February and October of 2015, and between February and June of 2017. Sampling was carried out between 9 a.m. and 2 p.m., using a Surber net and an entomological net of 25 cm in diameter. Four stations were selected in Pechilín Stream, 6 in Bobo, 2 in Macaján, and 1 in Camarón, and collections were made in 45-minute periods in each of them. Specimens were preserved in 85% ethanol and stored in plastic vials. Numbered labels were added to the plastic vials according to the collector of the material: Claudia Moreno-R. (CMR) or Wendy Molina-J. (WMJ). They have been deposited in the entomological collection of the Institute of Natural Sciences (ICN) of the National University of Colombia, in Bogotá.

Table 1 is based on the number of specimens collected and the number of times each species was found. Abundant species are those that were found 15 or more times, and the total number of individuals found in all samples was larger than 60. Frequent species are those that were found between 5 and 14 times, and the total number of

Table 1. Aquatic and semiaquatic bugs collected in Toluviejo, organized according to their relative abundances.

Species	Bobo Stream	Pechilín Stream	Camarón Stream	Macaján Stream
Abundant Species				
<i>Telmatometra ujhelyii</i>	+	+		+
<i>Trepobates trepidus</i>	+	+		
<i>Trepobates panamensis</i>	+	+		+
<i>Hydrometra caraiba[§]</i>	+	+	+	
<i>Rhagovelia tenuipes</i>	+	+	+	+
<i>Rheumatobates bergrothi[§]</i>	+	+		
<i>Gelastocoris major[§]</i>	+		+	+
Frequent Species				
<i>Rhagovelia calopa</i>		+		
<i>Tenagobia incerta[‡]</i>		+		
<i>Gelastocoris hungerfordi[§]</i>	+	+		
Occasional Species				
<i>Brachymetra albinervus</i>	+		+	
<i>Limnogonus aduncus</i>	+		+	
<i>Limnogonus hyalinus[§]</i>			+	
<i>Tachygerris opacus</i>			+	+
<i>Trepobates taylori[§]</i>		+		
<i>Ovatametra obesa[†]</i>		+		
<i>Mesovelia amoena[‡]</i>	+			+
<i>Mesovelia mulsanti[§]</i>		+		
<i>Mesoveloidae williamsi[‡]</i>		+		
<i>Microvelia longipes[§]</i>		+	+	+
<i>Microvelia mimula[†]</i>	+	+		
<i>Microvelia panamensis[§]</i>	+	+		+
<i>Microvelia pulchella[§]</i>		+		
<i>Platyvelia brachialis[‡]</i>	+			
<i>Rhagovelia elegans</i>	+	+		+
<i>Gelastocoris flavus flavus[§]</i>		+		
<i>Centrocoris kollaris[‡]</i>				+
<i>Curicta montei[†]</i>		+		
<i>Ranatra parvula[‡]</i>				+
<i>Buenoa platycnemis[‡]</i>	+	+		
<i>Martarega hondurensis[†]</i>		+		
<i>Martarega pacifica[‡]</i>	+			

[†] = First record from Colombia. [‡] = First record from the Colombian Caribbean Region. [§] = First record from Sucre Department.

individuals was between 10 and 60. Occasional species were found 4 or less times, and the total number of individuals was less than 10.

Results

Representatives of 8 families, 20 genera, and 32 species have been collected, of which 11 species are recorded for the first time from Sucre Department, 8 from the Colombian Caribbean region, and 4 from Colombia. Table 1 summarizes the species found in each stream surveyed and their relative abundances, as well as the first records from Sucre Department, the Colombian Caribbean region, and Colombia.

Infraorder Gerromorpha

Family Gerridae

Subfamily Charmatometrinae

Brachymetra Mayr, 1865

***Brachymetra albinervus* (Amyot & Serville, 1843)**

Figure 6

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Wendy Molina-J., 18.III.2017 (WMJ 074). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Claudia Moreno-R., 22.IV.2017 (CMR 133).

Identification. *Brachymetra albinervus* is extremely variable in terms of body size and general coloration, which cannot be reliably used for its recognition. Our specimens were identified based on the following characters: antennomere I shorter than II and III together; eye not surpassing the anterolateral angle of the pronotum; pronotum with apex rounded, not reaching the mesoacetabulum, without longitudinal dark brown stripe; fore femur robust and slightly arched, with sparse conical black setae ventrally (Fig. 7); and dorsum of acetabula with silvery setae. This combination of characters distinguishes them from all known congeners (Cordeiro 2017).

Distribution in the Colombian Caribbean region. Bolívar, Cesar (Aristizábal-García 2017), Córdoba (Aristizábal-García 2002), La Guajira (Molano-Rendón et al. 2008,



Figures 6, 7. *Brachymetra albinervus*. **6.** Macropteroous male, dorsal view. **7.** Male, fore femur, ventral view.

Morales-Castaño and Castro-Vargas 2010), Magdalena (Aristizábal-García 2002), Sucre (Aristizábal-García 2017, this work), Urabá antioqueño (Aristizábal-García 2002).

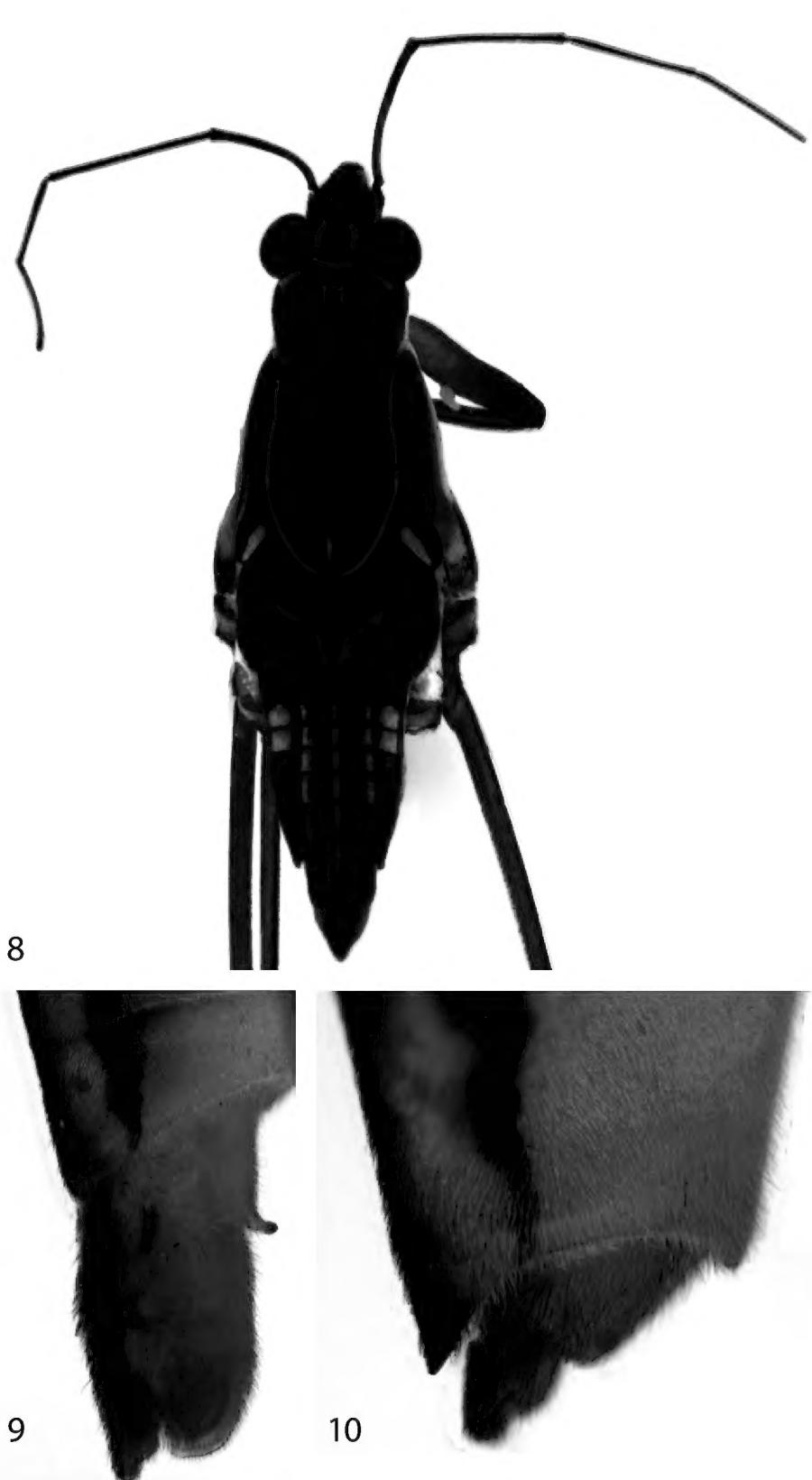
Subfamily Gerrinae
Limnogonus Stål, 1868

***Limnogonus aduncus* Drake & Harris, 1933**

Figures 8–10

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 6 ($09^{\circ}33'46''$ N, $075^{\circ}24'51''$ W), Wendy Molina-J., 28.II.2015 (WMJ 030). Colombia: Sucre: Toluviejo: Camarón Stream ($09^{\circ}32'32''$ N, $075^{\circ}24'33''$ W), Claudia Moreno-R., 11.II.2017 (CMR 115).

Identification. Males examined were easily identified as *L. aduncus* based on the shape of abdominal segment VIII, which has a small, downward curving, apical projection on the ventral surface (Fig. 9). Females are more difficult to identify but could be recognized by the antennomere I longer than the head width including the eyes, dorsal



Figures 8–10. *Limnogonus aduncus*. **8.** Apterous male, dorsal view. **9.** Male, apex of abdomen, lateral view. **10.** Female, apex of abdomen, lateral view.

portion of the mesopleura dark with a transversal light stripe in the middle, last abdominal laterotergite clearly projected posteriorly (Fig. 10), and posterior margin of abdominal sternite VII sharply projected in the middle (Nieser 1970).

Distribution in the Colombian Caribbean region. Cesar (Aristizábal-García 2017), Córdoba (Aristizábal-García 2002), Magdalena (Molano-Rendón et al. 2008, Aristizábal-García 2017), Sucre (Aristizábal-García 2017, this work).

***Limnogonus hyalinus* (Fabricius, 1803)**

New record. Colombia: Sucre: Toluviejo: Camarón Stream ($09^{\circ}32'32''$ N, $075^{\circ}24'33''$ W), Wendy Molina-J., 25.III.2017 (WMJ 076).

Identification. Males of *L. hyalinus* were separated from those of *L. aduncus* based on the shape of abdominal segment VIII. Both species display a posteroventral projection, however, the projection is much longer in

the former, extending at least to the same level of the posterodorsal margin of the same segment. Females of *L. hyalinus* can be confused with those of *L. aduncus* at first sight but could be distinguished from these based on the last abdominal laterotergite, which is truncate at apex, not projected beyond the corresponding mediotergite (Nieser 1970).

Distribution in the Colombian Caribbean region. Bolívar (Morales-Castaño and Castro-Vargas 2010), Sucre (this work).

Tachygerris Drake, 1957

Tachygerris opacus (Champion, 1898)

New records. Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Claudia Moreno-R., 11.II.2017 (CMR 115). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Wendy Molina-J., 11.II.2017 (WMJ 067). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

Identification. Females of *T. opacus* were identified by the posterior margin of abdominal sternite VII roundly projected in the middle, surpassing the acute and laterally curved spinose projections of the last abdominal laterotergites. Males were recognized by the following combination of characters: fore femur not widened on basal half, without protuberance or tubercle on posterior surface; proctiger elongated, with distal half subtriangular; and pygophore with 2 small teeth on dorsolateral margin, without large dorsal projection (Mondragón et al. 2017).

Distribution in the Colombian Caribbean region. Cesar (Aristizábal-García 2002, Morales-Castaño and Molano-Rendón 2009), Córdoba (Aristizábal-García 2002), Magdalena (Molano-Rendón et al. 2005), Sucre (Aristizábal-García 2017, this work).

Subfamily Rhagadotarsinae
Rheumatobates Bergroth, 1892

Rheumatobates bergrothi Meinert, 1895

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Claudia Moreno-R., 18.III.2017 (CMR 121). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Wendy Molina-J., 11.IV.2017 (WMJ 080). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 16.V.2015 (WMJ 044). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Claudia Moreno-R., 11.IV.2017 (CMR 131). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 05.IX.2015 (WMJ 057). Colombia:

Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 29.IV.2017 (WMJ 085). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 01.IV.2017 (WMJ 077). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 29.IV.2017 (CMR 135). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 05.IX.2015 (CMR 108). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 01.IV.2017 (CMR 128). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 29.IV.2017 (WMJ 087). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Wendy Molina-J., 22.IV.2017 (WMJ 083).

Identification. Material of the genus *Rheumatobates* was identified based on the males, which in some species have extreme modifications of the antennae and legs. *Rheumatobates bergrothi* is one of these cases, where the antennomere III displays a wide midventral projection and an indentation on the distal half, the hind trochanter bears 2 toothlike projections, and the hind femur has a pedunculated T-shaped structure on the mesal margin (Molano-Rendón et al. 2017a).

Distribution in the Colombian Caribbean region. La Guajira (Molano-Rendón et al. 2017a), Magdalena (Molano-Rendón et al. 2005, 2008, Castro-Vargas and Morales-Castaño 2011), Sucre (this work), Urabá antioqueño (Molano-Rendón et al. 2017a).

Subfamily Trepobatinae
Ovatametra Kenaga, 1942

Ovatametra obesa Kenaga, 1942

New record. Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 15.VIII.2015 (WMJ 052).

Identification. The taxonomy of *Ovatametra* is very coarse, because it was never revised and some species are distinguished in the literature based almost entirely on the color pattern, which is quite variable when a large population is sampled. To aid in the identification of our material, we compared it with photos of type or reference material of all described species of the genus. The females examined agree well with *O. obesa*, with body length around 3.0 mm and abdominal mediotergite VII with a tuft of setae near the middle of the posterior margin (Kenaga 1942). The pattern of dark stripes on the mesonotum, however, showed to be variable. Some specimens have the longitudinal dark stripes continuous along the segment and transversely connected on the anterior and posterior margins, whereas others have narrower, interrupted longitudinal stripes that do not connect anteriorly and posteriorly. The same type of variation was

observed by FFFM in large populations from the Brazilian Amazon.

Distribution in the Colombian Caribbean region. Sucre (this work).

Telmatometra Bergroth, 1908

***Telmatometra ujhelyii* Esaki, 1926**

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 18.III.2017 (WMJ 072). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Claudia Moreno-R., 26.IV.2014 (CMR 057). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Claudia Moreno-R., 17.V.2014 (CMR 063). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 18.VI.2014 (WMJ 020). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 28.III.2015 (WMJ 032). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Wendy Molina-J., 12.III.2014 (WMJ 003). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Wendy Molina-J., 17.V.2014 (WMJ 015). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.VI.2014 (CMR 070). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.III.2017 (CMR 123). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Wendy Molina-J., 12.IV.2014 (WMJ 004). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Wendy Molina-J., 11.IV.2017 (WMJ 080). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 03.V.2014 (WMJ 011). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 18.VI.2014 (WMJ 023). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 16.V.2015 (WMJ 044). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Claudia Moreno-R., 11.IV.2017 (CMR 131). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 11.IV.2015 (CMR 086). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 01.IV.2017 (WMJ 077). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 25.II.2017 (CMR 120). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 19.IV.2017 (CMR 136). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Claudia Moreno-R., 11.II.2017 (CMR 115). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 75°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

Identification. Specimens examined have the typical color pattern of *T. ujhelyii*, where there are no longitudinal dark marks on the pronotum, the anterior margin of the mesonotum is black, all longitudinal dark stripes of this segment reach the posterior margin, and the median longitudinal dark stripe is long, reaching the anterior margin in most cases (Molano-Rendón et al. 2017b). They were distinguished from the recently described *T. vallecaucana* Molano-Rendón, Mondragón & Morales-Castaño, 2017 by the absence of a posteroventral keel on the male abdomen and of yellow marks on the female metanotum.

Distribution in the Colombian Caribbean region. Cesar, Córdoba (Aristizábal-García 2002, 2017), La Guajira (Aristizábal-García 2002), Magdalena (Esaki 1926, Aristizábal-García 2002), Sucre (Aristizábal-García 2002, 2017, this work), Urabá antioqueño (Aristizábal-García 2002).

Trepidates Uhler, 1894

***Trepidates panamensis* Drake & Hottes, 1952**

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Claudia Moreno-R., 26.IV.2014 (CMR 056). Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 26.IV.2014 (WMJ 019). Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Claudia Moreno-R., 20.VI.2015 (CMR 098). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 20.VI.2015 (WMJ 050). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 18.III.2017 (WMJ 073). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Wendy Molina-J., 12.III.2014 (WMJ 003). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 17.V.2014 (CMR 064). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.VI.2014 (CMR 070). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Wendy Molina-J., 03.V.2014 (WMJ 010). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Claudia Moreno-R., 22.VIII.2015 (CMR 103). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 16.V.2015 (WMJ 044). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Wendy Molina-J., 28.III.2015 (WMJ 036). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Wendy Molina-J., 11.IV.2017 (WMJ 082). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 06.VI.2015 (WMJ 046). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 25.II.2017 (CMR

117). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 11.IV.2015 (CMR 087). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 01.IV.2017 (CMR 126). Colombia: Sucre: Toluviejo: Macaján Stream, station 1 (09°32'04" N, 075°24'52" W), Wendy Molina-J., 03.VI.2017 (WMJ 075). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 22.IV.2017 (CMR 132).

Identification. The 3 species of *Trepobates* occurring in Colombia have been collected in the study area. Males were identified as *T. panamensis* when the fore femur had no preapical constriction and the venter of abdominal segment VIII was covered only by short setae. Females were identified by the abdominal sternite VII not strongly projected posteriorly, with a fringe of short setae on the posterior margin (Aristizábal-García 2002).

Distribution in the Colombian Caribbean region. Córdoba (Morales-Castaño and Castro-Vargas 2010), Magdalena (Molano-Rendón et al. 2005), Sucre (Aristizábal-García 2017, this work).

Trepobates taylori (Kirkaldy, 1899)

New record. Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 01.IV.2017 (WMJ 077).

Identification. Males of *T. taylori* were distinguished from the other 2 species of the genus occurring in the study area by the fore femur with a preapical constriction and the venter of abdominal segment VIII covered only by short setae. Females were identified by the abdominal sternite VII not strongly projected posteriorly, without fringe of setae on the posterior margin (Aristizábal-García 2002).

Distribution in the Colombian Caribbean region. Bolívar (Aristizábal-García 2002), Cesar (Morales-Castaño and Castro-Vargas 2010), Córdoba, Magdalena (Morales-Castaño and Castro-Vargas 2010, Aristizábal-García 2017), Sucre (this work), Urabá antioqueño (Aristizábal-García 2002).

Trepobates trepidus Drake & Harris, 1928

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 26.IV.2014 (WMJ 007). Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Claudia Moreno-R., 18.VI.2014 (CMR 068). Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 20.VI.2015 (WMJ 049). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 16.V.2015 (WMJ 041). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 (09°33'45" N, 075°24'46" W), Claudia Moreno-R., 20.VI.2015 (CMR 099). Colombia:

Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Wendy Molina-J., 18.VI.2014 (WMJ 021). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.VI.2014 (CMR 100). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 (09°33'49" N, 075°24'49" W), Wendy Molina-J., 16.V.2015 (WMJ 043). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Wendy Molina-J., 18.VI.2014 (WMJ 024). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 11.IV.2015 (WMJ 037). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 05.IX.2015 (CMR 095). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 05.IX.2015 (WMJ 057). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 29.IV.2017 (CMR 134). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 11.IV.2015 (CMR 087). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 06.VI.2015 (WMJ 047). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 (09°26'10" N, 075°26'27" W), Claudia Moreno-R., 01.IV.2017 (CMR 127). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 (09°26'10" N, 075°26'27" W), Wendy Molina-J., 29.IV.2017 (WMJ 086). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 05.IX.2015 (CMR 108). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 29.IV.2017 (WMJ 087). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Wendy Molina-J., 22.IV.2017 (WMJ 083).

Identification. Males of *T. trepidus* were distinguished from the 2 previous species by the fore femur without preapical constriction and the venter of abdominal segment VIII covered by long setae. As for females, they have abdominal sternite VII projected posteriorly, partially covering the subsequent segments, with a fringe of long setae on the posterior margin (Aristizábal-García 2002).

Distribution in the Colombian Caribbean region. Cesar, Córdoba, La Guajira, Magdalena (Aristizábal-García 2002), Sucre (Aristizábal-García 2002, 2017, this work).

Family Hydrometridae
Subfamily Hydrometrinae
Hydrometra Latreille, 1796

Hydrometra caraiba Guérin-Méneville, 1857

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 28.III.2015 (WMJ 031). Colombia: Sucre: Toluviejo:

Bobo Stream, station 1 ($09^{\circ}33'47''$ N, $075^{\circ}24'51''$ W), Wendy Molina-J., 18.III.2017 (WMJ 072). Colombia: Sucre: Toluviejo: Bobo Stream, station 2 ($09^{\circ}33'45''$ N, $075^{\circ}24'46''$ W), Claudia Moreno-R., 18.III.2017 (CMR 122). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 ($09^{\circ}33'49''$ N, $075^{\circ}24'49''$ W), Claudia Moreno-R., 28.II.2015 (CMR 077). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 ($09^{\circ}33'49''$ N, $075^{\circ}24'49''$ W), Wendy Molina-J., 11.IV.2017 (WMJ 080). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 ($09^{\circ}33'48''$ N, $075^{\circ}24'52''$ W), Wendy Molina-J., 28.II.2015 (WMJ 029). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 ($09^{\circ}33'48''$ N, $075^{\circ}24'52''$ W), Claudia Moreno-R., 16.V.2015 (CMR 093). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 ($09^{\circ}33'46''$ N, $075^{\circ}24'51''$ W), Wendy Molina-J., 28.II.2015 (WMJ 030). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 ($09^{\circ}26'11''$ N, $075^{\circ}26'21''$ W), Wendy Molina-J., 11.IV.2015 (WMJ 037). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 ($09^{\circ}26'08''$ N, $075^{\circ}26'15''$ W), Wendy Molina-J., 01.IV.2017 (WMJ 077). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 ($09^{\circ}26'10''$ N, $075^{\circ}26'27''$ W), Claudia Moreno-R., 01.IV.2017 (CMR 127). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 ($09^{\circ}25'50''$ N, $075^{\circ}25'36''$ W), Wendy Molina-J., 25.II.2017 (WMJ 071). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 ($09^{\circ}25'50''$ N, $075^{\circ}25'36''$ W), Claudia Moreno-R., 29.IV.2017 (CMR 136). Colombia: Sucre: Toluviejo: Camarón Stream ($09^{\circ}32'32''$ N, $075^{\circ}24'33''$ W), Claudia Moreno-R., 11.II.2017 (CMR 115).

Identification. Males of *H. caraiba* were promptly identified by the abdominal sternite VII with a pair of curved brushes of setae located approximately in the middle of the segment. Females were identified by the combination of body about 18 mm long; clypeus broad, subquadrate, with a blunt median projection; and pro- and mesoacetabula with circular punctures (Moreira and Barbosa 2013).

Distribution in the Colombian Caribbean region. Atlántico (Hungerford and Evans 1934), Cesar (Morales-Castaño et al. 2008), Magdalena (Torre-Bueno 1926, Hungerford and Evans 1934), Sucre (this work).

Family Mesoveliidae

Subfamily Madeoveliinae

Mesoveloidae Hungerford, 1929

Mesoveloidae williamsi Hungerford, 1929

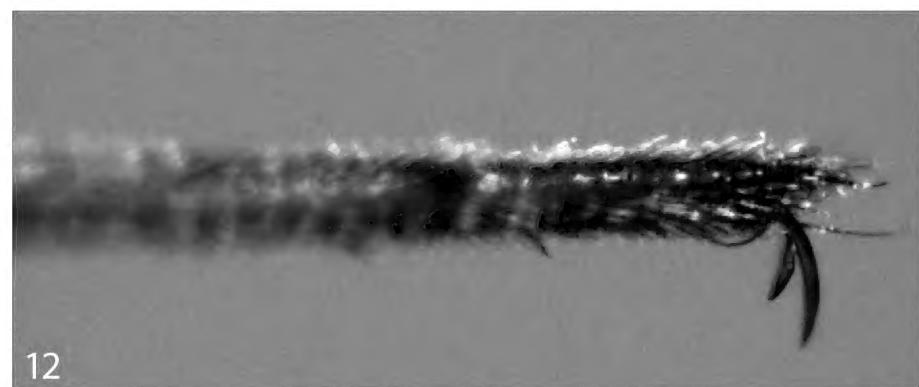
Figures 11, 12

New record. Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 ($09^{\circ}26'08''$ N, $075^{\circ}26'15''$ W), Wendy Molina-J., 01.IV.2017 (WMJ 078).

Identification. Our specimens were identified as *Mesoveloidae* based on the preapical pretarsal claws (Fig. 12) and the fully developed triangular scutellum, which are exclusive to this genus among Neotropical Mesoveliidae. Further identification as *M. williamsi* was based on the



11



12

Figures 11, 12. *Mesoveloidae williamsi*. **11.** Macropterous male, dorsal view. **12.** Male, apex of hind tarsus, lateral view.

shape of the male paramere, which agreed with those drawn by Jaczewski (1931) and Moreira et al. (2006).

Distribution in the Colombian Caribbean region. Sucre (this work).

Subfamily Mesoveliinae

Mesovelia Mulsant & Rey, 1852

Mesovelia amoena Uhler, 1894

Figure 13

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 4 ($09^{\circ}33'49''$ N, $075^{\circ}24'49''$ W), Claudia Moreno-R., 11.IV.2017 (CMR 129). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 ($09^{\circ}33'48''$ N, $075^{\circ}24'52''$ W), Claudia Moreno-R., 22.VIII.2015 (CMR 104). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 ($09^{\circ}32'05''$ N, $075^{\circ}24'53''$ W), Wendy Molina-J., 11.II.2017 (WMJ 067).

Identification. *Mesovelia amoena* is parthenogenetic in the tropics of America and in Hawaii, where it was introduced (Moreira et al. 2008). Therefore, our material consists solely of females, which could be determined by



Figure 13. *Mesovelia amoena*, apterous female, dorsal view.

the characters: body brown and around 2.0 mm long, and the middle femur without spines on the posterior surface (Moreira et al. 2008).

Distribution in the Colombian Caribbean region. Sucre (this work).

Mesovelia mulsanti White, 1879

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 6 (09°33'46" N, 075°24'51" W), Claudia Moreno-R., 28.II.2015 (CMR 079). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 29.IV.2017 (WMJ 087).

Identification. Differing from *M. amoena*, our material of *M. mulsanti* includes both males and females. They are clearly longer than the former species, with body length slightly over 3.0 mm, are lighter and yellowish, and have spines on the posterior surface of the middle femur. Males also show 2 tightly packed clusters of stout black spinules on abdominal sternite VIII (Moreira et al. 2008).

Distribution in the Colombian Caribbean region. Atlántico (Neering 1954), Cesar (Morales-Castaño et al. 2008), Magdalena (Floriano et al. 2016), Sucre (this work).

Family Veliidae
Subfamily Microveliinae
Microvelia Westwood, 1834

Microvelia longipes Uhler, 1894

New records. Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 (09°26'10" N, 075°26'27" W), Wendy Molina-J., 25.II.2017 (WMJ 070). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Wendy Molina-J., 11.II.2017 (WMJ 067). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Wendy Molina-J., 11.II.2017 (WMJ 066).

Identification. *Microvelia longipes* is probably the most easily identified Neotropical species of the genus. Males have strikingly long hind legs that are much longer than the body. Female hind legs reach at least the apex of the abdomen and are very long compared to other species of *Microvelia* (Nieser and Melo 1997, Padilla-Gil and Moreira 2013a).

Distribution in the Colombian Caribbean region. Cesar (Aristizábal-García 2017), Sucre (this work).

Microvelia mimula White, 1879

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 20.V.2017 (WMJ 088). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 29.IV.2017 (CMR 128).

Identification. Our material of this species was identified based on the males, because females can be confused with other species, especially when in the macropterous form. All males of *M. mimula* have the terminalia distinctly modified, with the dorsum of abdominal segment VIII expanded laterally, the venter of this segment widely excavated on the posterior margin, and the proctiger with large lateral projections (Drake and Carvalho 1954).

Distribution in the Colombian Caribbean region. Sucre (this work).

Microvelia panamensis Champion, 1898

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 20.V.2017 (WMJ 088). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 29.IV.2017 (WMJ 085). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 (09°26'10" N, 075°26'27" W), Claudia Moreno-R., 01.IV.2017 (CMR 127). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Wendy Molina-J., 11.II.2017 (WMJ 066).

Identification. Like the previous species, our material of *M. panamensis* was identified based on the males. In this case, there are no strong modifications of the terminalia, but they could be recognized by the venter of abdominal segment VIII elevated near the posterior margin, with an

apical fringe of anteriorly curving setae, which are more easily seen in lateral view (Polhemus 1977). Males also have minute spines on the hind femur, which were broken in some specimens, and straight hind tibia.

Distribution in the Colombian Caribbean region. Cesar (Polhemus 1977), Sucre (this work).

Microvelia pulchella Westwood, 1834

New records. Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 11.IV.2015 (WMJ 037). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 25.II.2017 (CMR 118).

Identification. Our specimens of *M. pulchella* were identified based on the short pronotum in the apterous form, not covering the mesonotum (Nieser and Melo 1997, Padilla-Gil and Moreira 2013a), and the bent hind tibia of the males. Males are elongated, with the sides of body more or less parallel, whereas females are much more robust and rounded.

Distribution in the Colombian Caribbean region. Cesar (Morales-Castaño et al. 2008), Sucre (this work).

Subfamily Rhagoveliinae

Rhagovelia Mayr, 1865

Rhagovelia calopa Drake & Harris, 1927

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.III.2017 (CMR 123). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 25.II.2017 (CMR 117). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 29.IV.2017 (WMJ 085). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 01.IV.2017 (CMR 126). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 25.II.2017 (WMJ 071).

Identification. Our specimens clearly belong to the *angustipes* complex *sensu* Polhemus (1997), based on the pronotum of the apterous form shorter than the dorsal length of the eye. Males examined have the hind trochanter with several spinules and hind femur strongly incrassate (Bacon 1956), which are found in only 1 species of the complex: *R. calopa*.

Distribution in the Colombian Caribbean region. Cesar, Córdoba, La Guajira (Aristizábal-García 2017), Magdalena (Bacon 1956, Aristizábal-García 2017), Sucre (Aristizábal-García 2017, this work), Urabá antioqueño (Aristizábal-García 2017).

Rhagovelia elegans Uhler, 1894

New records. Colombia: Sucre: Toluviejo: Bobo Stream,

station 2 (09°33'45" N, 075°24'46" W), Wendy Molina-J., 26.IV.2014 (WMJ 008). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 29.IV.2017 (CMR 134). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 25.II.2017 (WMJ 071). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

Identification. Specimens examined belong to the *elegans* group *sensu* Polhemus (1997) based on the pronotum of the apterous form completely covering the mesonotum, posterolateral margins of male abdominal segment VII without black denticles, and posterior tibia of males and females with a crescent-shaped spur at the apex. Our individuals also display proctiger not prolonged posteriorly into a spine-like process and posterior femur with a single row of spines, which lead to the identification as *R. elegans* (Polhemus 1997).

Distribution in the Colombian Caribbean region. Cesar (Aristizábal-García 2017), Magdalena (Polhemus 1997), Sucre (Aristizábal-García 2017, this work).

Rhagovelia tenuipes Champion, 1898

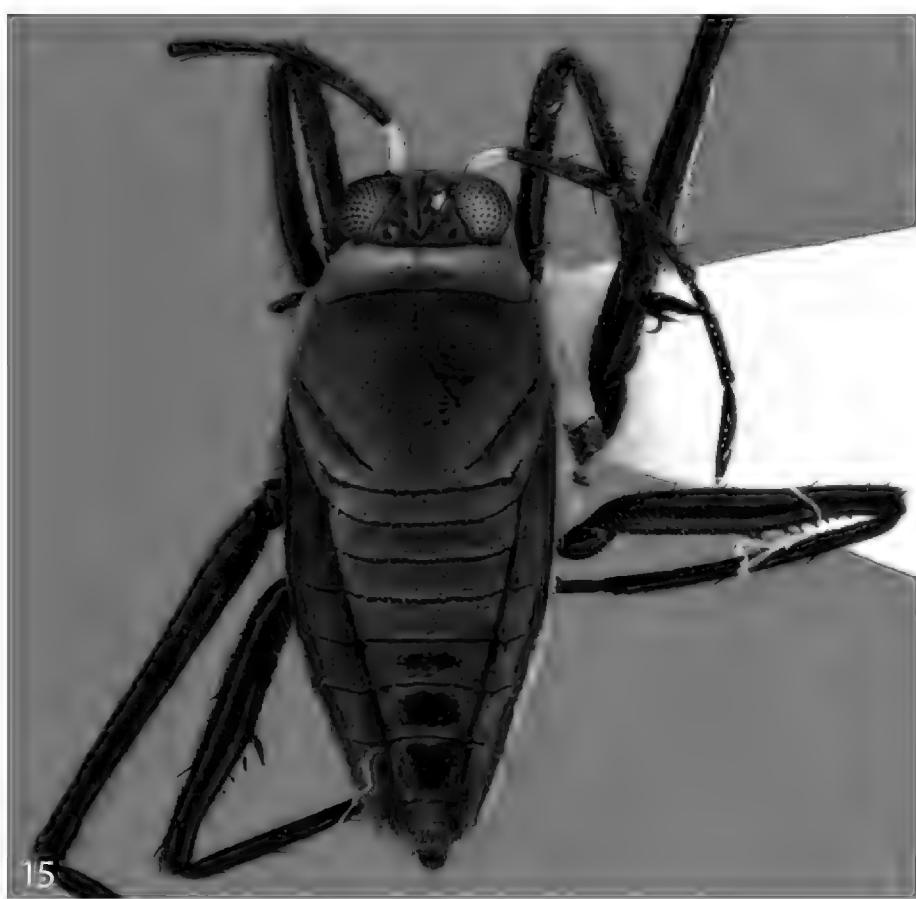
Figures 14, 15

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Claudia Moreno-R., 18.VI.2014 (CMR 068). Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 20.VI.2015 (WMJ 049). Colombia: Sucre: Toluviejo: Bobo Stream, station 3 (09°33'48" N, 075°24'39" W), Claudia Moreno-R., 18.III.2017 (CMR 123). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Claudia Moreno-R., 29.IV.2017 (CMR 117). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 29.IV.2017 (WMJ 085). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 25.II.2017 (CMR 118). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Wendy Molina-J., 01.IV.2017 (WMJ 077). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 25.II.2017 (CMR 120). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

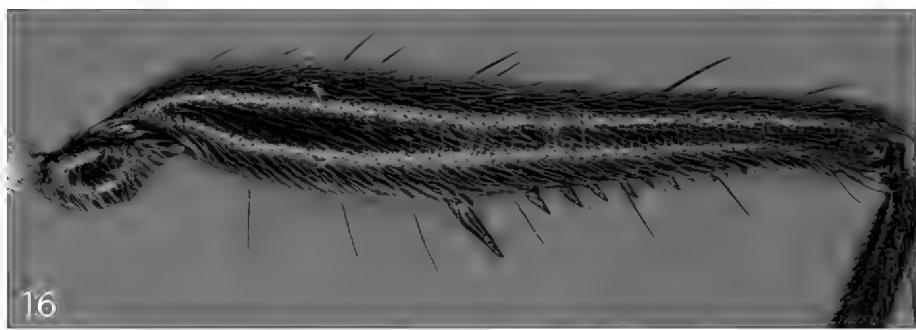
Identification. Like *R. calopa*, the species above belongs to the *angustipes* complex. *Rhagovelia tenuipes* is the most widespread and variable species of the complex, but our material is well within the known variation of the species: abdominal mediotergites V–VIII are shining black centrally; sides of male abdomen are bowed outward; female abdominal laterotergites are not reflexed over the abdomen; hind trochanter is black; male hind femur is long and sinuous, with a longer spine near the



14



15



16

Figures 14–16. *Rhagovelia tenuipes*. **14.** Apterous male, dorsal view. **15.** Apterous female, dorsal view. **16.** Male, hind trochanter, femur, and base of tibia, ventral view.

middle followed by a series of shorter spines to the apex (Fig. 16); and male hind tibia has spinules along the length and a straight apical spur (Bacon 1956).

Distribution in the Colombian Caribbean region. Cesar, Córdoba, La Guajira, Magdalena (Aristizábal-García 2017), Sucre (Aristizábal-García 2017, this work), Urabá antioqueño (Aristizábal-García 2017).

Subfamily Veliinae

Platyvelia Polhemus & Polhemus, 1993

Platyvelia brachialis (Stål, 1860)

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 3 ($09^{\circ}33'48''$ N, $075^{\circ}24'39''$ W), Wendy Molina-J., 18.III.2017 (WMJ 074). Colombia: Sucre: Toluviejo: Bobo Stream, station 4 ($09^{\circ}33'49''$ N, $075^{\circ}24'49''$ W), Wendy Molina-J., 28.II.2015 (WMJ 028). Colombia: Sucre: Toluviejo: Bobo Stream, station 6 ($09^{\circ}33'46''$ N, $075^{\circ}24'51''$ W), Claudia Moreno-R., 28.II.2015 (CMR 079).

Identification. Our specimens of *P. brachialis* were identified based on the following combination of characters: posterior margin of male abdominal sternite VI without projections; pronotum not shortened posteriorly, with anterior margin narrower than head width through eyes, and anterolateral angles not projected; and jugum, apex of pleurite VII, and base of VIII with several black denticles. Some of these features are not readily available from the literature but will be published in a forthcoming revision of the genus by FFFM.

Distribution in the Colombian Caribbean region. Sucre (this work).

Infraorder Nepomorpha

Family Corixidae

Subfamily Corixinae

Centrocoris Lundblad, 1928

Centrocoris kollari (Fieber, 1851)

New record. Colombia: Sucre: Toluviejo: Macaján Stream, station 1 ($09^{\circ}32'4''$ N, $75^{\circ}24'52''$ W), Wendy Molina-J., 03.VI.2017 (WMJ 075).

Identification. *Centrocoris* is a small genus of large and broad Corixidae. Its 2 species are characterized by the characters: body more than one-third as broad as long; hypo-ocular suture arising about midway along the ventral margin of the eye; and males without strigil. The female found in Toluviejo was identified as *C. kollari* based on the presence of a tuft of thin setae on the corium near the nodal furrow, and on a stripe on clavus near the distal third of the claval suture (Nieser 1969).

Distribution in the Colombian Caribbean region. Sucre (this work).

Subfamily Micronectinae

Tenagobia Bergroth, 1899

Tenagobia incerta Lundblad, 1928

New records. Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 ($09^{\circ}26'11''$ N, $075^{\circ}26'21''$ W), Wendy Molina-J., 29.IV.2017 (WMJ 037). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 ($09^{\circ}26'10''$ N, $075^{\circ}26'27''$ W), Claudia Moreno-R., 01.IV.2017 (CMR 127). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 ($09^{\circ}25'50''$ N, $075^{\circ}25'36''$ W), Claudia Moreno-R., 01.IV.2017 (CMR 128). Colombia: Sucre: Toluviejo:

Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Wendy Molina-J., 29.IV.2017 (WMJ 087).

Identification. The genus *Tenagobia* is easily differentiated from other Corixidae. They are characterized by the antenna three-articulated, the scutellum not covered by the pronotum, and the mesosternum without carina. Species of *Tenagobia*, otherwise, are hardly identified due to the small size and descriptions largely based on the number of setae in different positions of the body. Our small and yellow to brownish specimens were identified as *Tenagobia incerta* based on the eyes distinctly less wide than the synthlipsis, the hemelytra with faded reticulate pattern and 3 brown spots along the costal margin, the forefemur with a ventral spur on the basal half, and the palar claw located in a spatulate process (Nieser 1977a).

Distribution in the Colombian Caribbean region. Sucre (this work).

Family Gelastocoridae

Subfamily Gelastocorinae

Gelastocoris Kirkaldy, 1897

Gelastocoris flavus flavus (Guérin-Méneville, 1835)

New record. Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 (09°25'50" N, 075°25'36" W), Claudia Moreno-R., 15.VIII.2015 (CMR 102).

Identification. Specimens of *Gelastocoris* have cryptical coloration and there is a lot of intraspecific variability, which makes it unsuitable for identification. The secure determination of specimens relies mainly on the structure of the male genitalia, which is more stable within each species. Our material of *G. f. flavus* was identified based on the following combination of characters: pronotum with lateral margin clearly notched, without longitudinal carinae on the posterior portion; and male genitalia with tumescence of right clasper adnate to the base of clasper, pan rounded, wider than long, not bilobed, and keel hook long and curved, extending to the base of the pan (Todd 1955).

Distribution in the Colombian Caribbean region. Bolívar (Nieser and Chen 1992), Sucre (this work).

Gelastocoris hungerfordi Melin, 1929

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 18.III.2017 (WMJ 072). Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 (09°26'08" N, 075°26'15" W), Claudia Moreno-R., 25.II.2017 (CMR 118). Colombia: Sucre: Toluviejo: Pechilín Stream, station 3 (09°26'10" N, 075°26'27" W), Claudia Moreno-R., 25.II.2017 (CMR 119).

Identification. Like in *G. f. flavus*, specimens of *G. hungerfordi* also have pronotum with lateral margin clearly notched, without longitudinal carinae on the posterior

portion. They were distinguished from the former species based on the male genitalia with the tumescence of the right clasper not adnate to the base of the clasper; keel hook shorter, not reaching the base of the pan; and pan shorter and narrower. Besides that, the male genitalia of *G. hungerfordi* is unique because the fringe of the keel hood bends towards the hood's apex at the middle, then is obliquely concave towards the right margin of the apex of the keel, and by the presence of a prominent secondary keel hood (Todd 1955).

Distribution in the Colombian Caribbean region. Córdoa (Melin 1929), La Guajira (Todd 1955), Sucre (this work).

Gelastocoris major Montandon, 1910

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 1 (09°33'47" N, 075°24'51" W), Wendy Molina-J., 17.V.2014 (WMJ 013). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Claudia Moreno-R., 22.VIII.2015 (CMR 104). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 (09°33'48" N, 075°24'52" W), Wendy Molina-J., 11.IV.2017 (WMJ 081). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Claudia Moreno-R., 11.II.2017 (CMR 115). Colombia: Sucre: Toluviejo: Camarón Stream (09°32'32" N, 075°24'33" W), Wendy Molina-J., 22.IV.2017 (WMJ 084). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

Identification. Our specimens were identified as *G. major* based on the bilobed pan of the male genitalia (Todd 1955), which is unique in the genus.

Distribution in the Colombian Caribbean region. Magdalena (Todd 1955), Sucre (this work).

Family Nepidae

Subfamily Nepinae

Curicta Stål, 1862

Curicta montei De Carlo, 1961

New record. Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 (09°26'11" N, 075°26'21" W), Wendy Molina-J., 29.IV.2017 (WMJ 037).

Identification. Our material of *C. montei* was identified based on the pronotum without black granulation; posterior half of prosternum not strongly swollen; fore femur longer than the lateral length of pronotum by less than 1 mm, with 1 tooth on each side of the base of the longitudinal sulcus, these teeth located closer to the apex of the femur than to the base; longitudinal sulcus of the fore femur with sulcal teeth, without distinct notch on the distal portion of the lateral margin; and parasterna of the last abdominal segment ending in large, thumblike processes (Keffer 1997).

Distribution in the Colombian Caribbean region. Sucre (this work).

Subfamily Ranatrinae
Ranatra Fabricius, 1790

***Ranatra parvula* Kuitert, 1949**

New record. Colombia: Sucre: Toluviejo: Macaján Stream, station 2 ($09^{\circ}32'05''$ N, $075^{\circ}24'53''$ W), Claudia Moreno-R., 11.II.2017 (CMR 116).

Identification. Our material of *R. parvula* was identified based on the following combination of characters: interocular space without tubercle; pronotum shorter on midline than fore femur; hind femur reaching the base of the genital operculum; female genital operculum extending less than 0.1 mm beyond apex of abdomen; and respiratory tube longer than body (Nieser 1975).

Distribution in the Colombian Caribbean region. Sucre (this work).

Family Notonectidae
Subfamily Anisopinae
Buenoa Kirkaldy, 1904

***Buenoa platycnemis* (Fieber, 1851)**

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 4 ($09^{\circ}33'49''$ N, $075^{\circ}24'49''$ W), Wendy Molina-J., 11.IV.2017 (WMJ 080). Colombia: Sucre: Toluviejo: Pechilín Stream, station 1 ($09^{\circ}26'11''$ N, $075^{\circ}26'21''$ W), Wendy Molina-J., 25.II.2017 (WMJ 068).

Identification. Species of *Buenoa* are identified based mainly on features of the males, such as the shape of the rostral prong and the stridulatory structures of foreleg. *Buenoa platycnemis* has a wide distribution and variation of color, which is therefore not useful for its determination. Our material was identified based on the male rostral prong originating laterally on the distal region of the third rostral segment, protruding basally, and distinctly longer than this segment; the tricarinate pronotum; and the fore femur with 11 to 14 stridulatory ridges (Barbosa and Nessimian 2013).

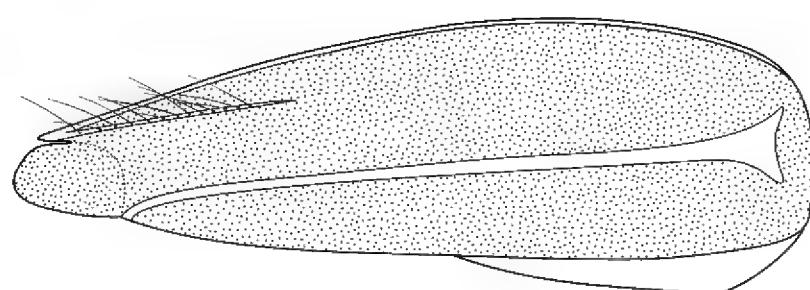
Distribution in the Colombian Caribbean region. Sucre (this work).

Subfamily Notonectinae
Martarega White, 1879

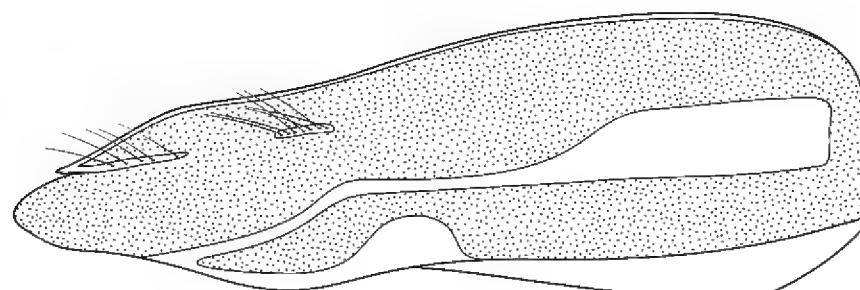
***Martarega hondurensis* Bare, 1932**

Figures 17, 18

New records. Colombia: Sucre: Toluviejo: Pechilín Stream, station 2 ($09^{\circ}26'08''$ N, $075^{\circ}26'15''$ W), Wendy Molina-J., 15.VIII.2015 (WMJ 052). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 ($09^{\circ}25'50''$ N, $075^{\circ}25'36''$ W), Claudia Moreno-R., 01.IV.2017 (CMR 128).



17



18

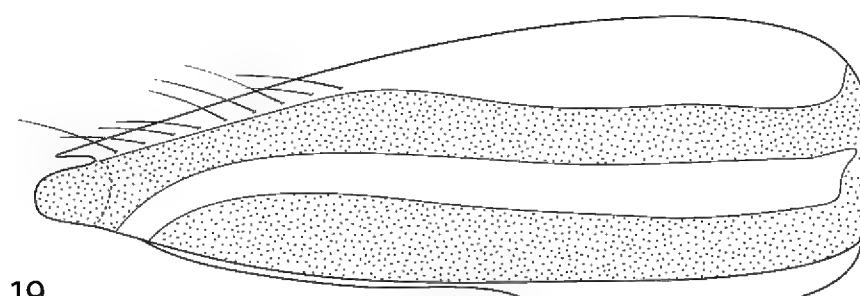
Figures 17, 18. *Martarega hondurensis*. **17.** Brachypterous male, forewing, lateral view. **18.** Brachypterous female, forewing, lateral view.

Identification. The main features used to identify species of *Martarega* are found in wings of brachypterous specimens. Our male individuals were identified as *M. hondurensis* based on the narrow median longitudinal hyaline stripe on the hemelytra, hyaline stripe of the hemelytral process continuous (Fig. 17), and proximal third of fore femur with a group of ensiform setae. On the females, the longitudinal stripe of the hemelytra is wide, narrowing on the posterior two-thirds of its length and extending along the costal margin, and the stripe of the hemelytral process is discontinued by an opaque area for one-fourth of its length (Fig. 18) (Barbosa 2014).

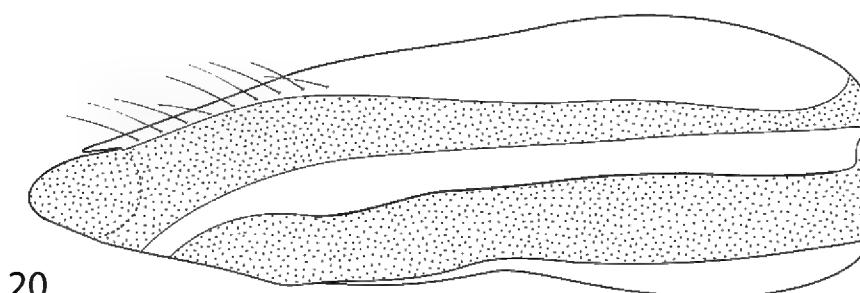
Distribution in the Colombian Caribbean region. Sucre (this work).

***Martarega pacifica* Manzano, Nieser & Caicedo, 1995**
Figures 19–20

New records. Colombia: Sucre: Toluviejo: Bobo Stream, station 3 ($09^{\circ}33'48''$ N, $075^{\circ}24'39''$ W), Wendy Molina-J., 26.IV.2014 (WMJ 009). Colombia: Sucre: Toluviejo: Bobo Stream, station 5 ($09^{\circ}33'48''$ N, $075^{\circ}24'52''$ W), Wendy Molina-J., 12.IV.2014 (WMJ 005). Colombia: Sucre: Toluviejo: Pechilín Stream, station 4 ($09^{\circ}25'50''$ N, $075^{\circ}25'36''$ W), Claudia Moreno-R., 01.IV.2017 (CMR



19



20

Figures 19, 20. *Martarega pacifica*. **19.** Brachypterous male, forewing, lateral view. **20.** Brachypterous female, forewing, lateral view.

128). Colombia: Sucre: Toluviejo: Macaján Stream, station 2 (09°32'05" N, 075°24'53" W), Claudia Moreno-R., 03.VI.2017 (CMR 140).

Identification. Unlike *M. hondurensis*, males and females of *M. pacifica* do not show sexual dimorphism on the pattern of hemelytral stripes. Our material was determined based on the scutellum with the anterior half opaque and the posterior half hyaline, hyaline stripes of the claval commissure and hemelytral process fused, median longitudinal hyaline stripe wide (Figs. 19–20), hemelytral process shorter than membrane, and male fore- and mesotrochanters without groups of ensiform setae (Barbosa 2014).

Distribution in the Colombian Caribbean region. Sucre (this work).

Discussion

According to Aristizábal-García (2017), 21 species of aquatic and semiaquatic bugs have been recorded from Sucre, to which this survey adds 23, representing a 109.5% increase in our knowledge of the department's fauna. There is certainly still a lot to be explored in the study area. For example, we collected specimens of the families Hebridae and Belostomatidae, but identification was not possible because the material deteriorated after preservation or was composed solely of immatures and/or females. In addition, saucer bugs (Naucoridae) have been collected and found to represent undescribed species. These have been sent to a specialist in the group to be published in a separate study.

Three of the most abundant species in the streams surveyed, namely *Telmatometra ujhelyii*, *Trepobates trepidus*, and *Tr. panamensis*, are widely distributed from Mexico or southern United States to Ecuador (Drake and Hottes 1951, 1952, Polhemus and Polhemus 2002, Buzzetti and Cianferoni 2011). They are quite common in Colombia and their occurrences in Sucre Department were already known (Aristizábal-García 2002, 2017). *Hydrometra caraiba* and *Rhagovelia tenuipes*, also very abundant in Toluviejo, are even more widespread, ranging from Mexico to Brazil (Moreira et al. 2009, Padilla-Gil and Moreira 2013b). They occur in several departments of the Caribbean region of Colombia (Torre-Bueno 1926, Hungerford and Evans 1934, Morales-Castaño et al. 2008, Aristizábal-García 2017), but the former is herein recorded from Sucre for the first time. The last 2 of the abundant species, *Rheumatobates bergrothi* and *Gelastocoris major*, are also newly recorded from Sucre. The former is known from Honduras to Colombia (Polhemus and Spangler 1989, Castro-Vargas and Morales-Castaño 2011), and the nearest report is from approximately 200 km, at the Gulf of Urabá (Molano-Rendón et al. 2017a); whereas the latter occurs from Panama to Chile (Todd 1961), and has been previously recorded in the Caribbean region of Colombia only in the Sierra Nevada de Santa Marta, about 240 km from Toluviejo (Todd 1955).

Of the 3 species considered frequent in the study area, *Tenagobia incerta* is herein recorded for the first time from the Caribbean Region of Colombia. This species is widespread from Panama and Trinidad & Tobago to Argentina (Nieser 1977a) and has been recorded from the Colombian departments of Meta and Nariño (Roback and Nieser 1974, Padilla-Gil 2012), but the closest report is actually from Panama, about 430 km away from Toluviejo (Nieser 1977a). *Gelastocoris hungerfordi* is herein recorded for the first time from Sucre Department, but occurs throughout a wide geographic area, from southern United States to northern Brazil (Millspaugh 1939, Todd 1961). The closest report is from approximately 115 km away in Córdoba Department. The third frequent species, *Rhagovelia calopa*, occurs from Mexico to Trinidad & Tobago (Padilla-Gil and Moreira 2013b), and was previously recorded from Sucre Department by Aristizábal-García (2017).

It is among the occasional species that we find the most interesting results from this survey. Species such as *Brachymetra albinervus*, *Limnogonus aduncus*, *Tachygerris opacus*, and *Rhagovelia elegans* are very commonly collected in Central and/or South America (Padilla-Gil and Moreira 2013b, Damgaard et al. 2014, Cordeiro 2017), and were previously reported from Sucre Department (Aristizábal-García 2017). On the other hand, 4 of the occasional species are herein recorded for the first time from Colombia: *Microvelia mimula*, *Ovatametra obesa*, *Curicta montei*, and *Martarega hondurensis*.

Microvelia mimula is an extremely common and easily recognized species found in pools and ponds from Cuba to Argentina (Cordeiro and Moreira 2015), and the lack of previous records from Colombia is surely tied to the almost complete absence of studies regarding this genus in the country. *Ovatametra obesa* is not an uncommon species in northern Brazil (Moreira et al. 2011), and the first record from Colombia is not surprising. As explained in the results above, the taxonomy of this genus is not well resolved, and published records of other species in the country (Padilla-Gil 2016) might be based on misidentifications. *Martarega hondurensis* has records from Belize to Peru, with huge gaps along this area (Barbosa 2014), which we help to fill based on the material collected in Colombia. As for *Curicta montei*, it has scattered records along the northern coast of South America, from Guárico in Venezuela to Pernambuco in Brazil (Keffer 1997). The new record from Colombia presented here extends its distribution about 1,000 km to the west.

Furthermore, 7 first records from the Caribbean region of Colombia are based on the occasional species: *Mesovelia amoena*, *Mesoveloides williamsi*, *Platyvelia brachialis*, *Centrocorisa kollari*, *Ranatra parvula*, *Buenoa platycnemis*, and *Martarega pacifica*. *Mesovelia amoena* occurs from Canada to southeastern Brazil and was introduced in the Hawaiian Islands (Damgaard et al. 2012). Despite this wide range, the only published record from Colombia is based on material collected in Antioquia

Department (Alvarez and Roldán-Pérez 1983), around 370 km from Toluviejo. *Mesoveloides williamsi* has been recorded from Mexico to southeastern Brazil (Moreira et al. 2006), including a few localities in Colombia (Alvarez and Roldán-Pérez 1983, Morales-Castaño and Molano-Rendón 2008, Padilla-Gil 2013). The published record nearest from Toluviejo, about 430 km to the west, is in Tocumen, Panama (Froeschner 1999).

Platyvelia brachialis is the most common and widespread species of the genus, being found from eastern United States to northern Argentina (Perez-Gelabert and Floriano 2016). The first 2 records from Colombia are very recent, one at Norte de Santander Department, about 375 km away from Toluviejo (Molano-Rendón et al. 2016), and the other from Meta Department, approximately 640 km southeast of our study area (Floriano et al. 2017). *Centrocoris kollari* has been collected from Mexico to northern Argentina (Hungerford 1948, Bachmann 1981), but has many gaps in this large area. The closest record in Colombian territory is in Antioquia Department, around 407 km south of Toluviejo (Alvarez and Roldán-Pérez 1983). *Ranatra parvula* has been collected only a few times in northern Brazil and in the Colombian department of Meta (Roback and Nieser 1974, Nieser 1975). The new record presented here expands the distribution of the species about 640 km to the northwest.

Buenoa platycnemis is a common species from southern United States to Argentina (Truxal 1953). It has been recorded from the Colombian departments of Cundinamarca, Meta, and Huila (Truxal 1953, Roback and Nieser 1974, Padilla-Gil and Nieser 1992). The nearest record is about 310 km southwest of Toluviejo, at the Dárien Region, Panamá (Truxal 1953). *Martarega pacifica* is the only species found during our survey that is endemic from Colombia, with published records restricted to Valle del Cauca Department (Manzano et al. 1995, Padilla-Gil 2015), about 650 km southwest of Toluviejo.

Finally, 7 of the occasional species are recorded for the first time from Sucre: *Limnogomus hyalinus*, *Treptobates taylori*, *Mesovelia mulsanti*, *Microvelia longipes*, *Mi. panamensis*, *Mi. pulchella*, and *Gelastocoris flavus*. These are very common and widely distributed species, and the new records from the department help only in filling gaps, with the exception of *Mi. panamensis* and *G. f. flavus*. *Microvelia panamensis* is known from a few localities in Costa Rica and Panama (Polhemus 1977, Pacheco-Chaves et al. 2014) and has only 2 records from Colombia: one about 230 km from Toluviejo at the Sierra Nevada de Santa Marta in Cesar Department (Polhemus 1977), and the other from an unknown locality in Antioquia Department (Aristizábal-García 2017). *Gelastocoris f. flavus* occurs all over South America, from Colombia to Uruguay (Nieser 1977b). However, the 2 previous records from Colombia are highly imprecise: Nieser (1977b) recorded the species from the country without further details, and Nieser and Chen (1992) recorded it from “Batal”, an unknown locality in Bolívar Department.

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Authors' Contributions

CMR and WMJ collected specimens and wrote the manuscript. FFFM and JFB identified specimens and revised the manuscript.

References

- Aguas A, Pérez R, Márquez C., Paternina R (2008) Plan de Desarrollo de Toluviejo, Sucre. Alcaldía de Santiago de Tolú, Santiago de Tolú, 220 pp.
- Alvarez LF, Roldán-Pérez G (1983) Estudio del orden Hemiptera (Heteroptera) en el Departamento de Antioquia en diferentes pisos altitudinales. Actualidades Biológicas 12 (44): 31–45.
- Aristizábal-García H (2002) Los Hemípteros de la Película Superficial del Agua en Colombia. Parte I. Familia Gerridae. Academia Colombiana de Ciencias Exactas Físicas y Naturales, Bogotá, 239 pp.
- Aristizábal-García H (2017) Hemípteros Acuáticos y Semiacuáticos del Neotrópico. Academia Colombiana de Ciencias Exactas Físicas y Naturales, Bogotá, 984 pp.
- Bachmann AO (1981) Insecta Hemiptera Corixidae. Fauna de Agua Dulce de la Republica Argentina 35 (2): 1–270 + 34 pls.
- Bacon JA (1956) A taxonomic study of the genus *Rhagovelia* (Hemiptera, Veliidae) of the Western Hemisphere. University of Kansas Science Bulletin 38 (10): 695–913.
- Barbosa JF (2014) Revisão e análise filogenética do gênero *Martarega* White, 1879 (Hemiptera: Heteroptera: Nepomorpha: Notonectidae). PhD Thesis, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 283 pp.
- Barbosa JF, Nessimian JL (2013) The genus *Buenoa* Kirkaldy, 1904 (Hemiptera: Heteroptera: Nepomorpha: Notonectidae) in northern Brazil: inventory, new records, and new species. Zootaxa 3694 (2): 101–130. <http://doi.org/10.11646/zootaxa.3694.2.1>
- Buzzetti FM, Cianferoni F (2011) Checklist of the Gerromorpha from Ecuador (Hemiptera: Heteroptera). Edessana, Beiträge zur Taxonomie, Faunistik und Ökologie insbesondere tropischer Heteropteren 1: 117–125.
- Castro-Vargas MI, Morales-Castaño IT (2011) The *Rheumatobates* Bergroth, 1892 (Hemiptera: Heteroptera: Gerridae) of Colombia, including the description of *R. plumipes* n. sp. and a key to represented species. Zootaxa 3040: 1–18.
- Cordeiro IRS (2017) Revisão taxonômica de *Brachymetra* Mayr, 1865 (Insecta: Heteroptera: Gerridae). Master dissertation, Universidade Federal Rural do Rio de Janeiro, Seropédica, 96 pp.

- Cordeiro IRS, Moreira FFF (2015) New distributional data on aquatic and semiaquatic bugs (Hemiptera: Heteroptera: Gerromorpha & Nepomorpha) from South America. *Biodiversity Data Journal* 3: e4913. <http://doi.org/10.3897/BDJ.3.e4913>
- Damgaard J, Moreira FFF, Hayashi M, Weir TA, Zettel H (2012) Molecular phylogeny of the pond treaders (Insecta: Hemiptera: Heteroptera: Mesovelidae), discussion of the fossil record and a checklist of species assigned to the family. *Insect Systematics & Evolution* 43: 175–212. <https://doi.org/10.1163/1876312X04302004>
- Damgaard J, Moreira FFF, Weir TA, Zettel H (2014) Molecular phylogeny of the pond skaters (Gerrinae), discussion of the fossil record and a checklist of species assigned to the subfamily (Hemiptera: Heteroptera: Gerridae). *Insect Systematics & Evolution* 45: 251–281 + S1–S43. <https://doi.org/10.1163/1876312X-44042105>
- Drake CJ, Carvalho JCM (1954) New waterstriders from Brazil (Hemiptera). *Proceedings of the Biological Society of Washington* 67: 223–226.
- Drake CJ, Hottes FC (1951) A new halobatinid from Mexico (Hemiptera: Gerridae). *Proceedings of the Biological Society of Washington* 64: 131–143.
- Drake CJ, Hottes FC (1952) Genus *Trepobates* Herrich-Schaeffer (Hemiptera; Gerridae). *Great Basin Naturalist* 12 (1–4): 35–38.
- Esaki T (1926) The water-striders of the subfamily Halobatinae in the Hungarian National Museum. *Annales Musei Nationalis Hungarici* 23: 117–164.
- Floriano CFB, Moreira FFF, Bispo PC, Morales-Castaño IT, Molano-Rendón F (2016) A new species of *Mesovelia* (Heteroptera: Gerromorpha: Mesovelidae) from South America, with identification key and notes on Colombian species. *Zootaxa* 4175 (4): 345–352. <http://doi.org/10.11646/zootaxa.4175.4.4>
- Floriano CFB, Moreira FFF, Bispo PC (2017) New records of Gerromorpha (Insecta: Hemiptera: Heteroptera) from the Neotropical Region. *Transactions of the American Entomological Society* 143: 103–117. <https://doi.org/10.3157/061.143.0202>
- Froeschner RC (1999) True bugs (Heteroptera) of Panama: a synoptic catalog as a contribution to the study of Panamanian biodiversity. *Memoirs of the American Entomological Institute* 61: 1–393.
- Hungerford HB (1948) The Corixidae of the Western Hemisphere (Hemiptera). *University of Kansas Science Bulletin* 32: 1–827.
- Hungerford HB, Evans NE (1934) The Hydrometridae of the Hungarian National Museum and other studies in the family. (Hemiptera). *Annales Musei Nationalis Hungarici* 28: 31–112.
- Instituto Geográfico Agustín Codazzi [IGAC] (1996) Diccionario Geográfico de Colombia. Tomo 4. Rabal - Zuzaga. Instituto Geográfico Agustín Codazzi, Bogotá, 2515 pp.
- Instituto Geográfico Agustín Codazzi [IGAC] (1998) Estudio General de Suelos y Zonificación de Tierras, Departamento de Sucre. Instituto Geográfico Agustín Codazzi, Bogotá, 124 pp.
- Jaczewski T (1931) The male of *Mesoveloides williamsi* Hungerford (Hemiptera: Heteroptera). *Proceedings of the Entomological Society of Washington* 33 (3): 64–65.
- Keffer SL (1997) Systematics of the New World waterscorpion genus *Curicta* Stål (Heteroptera: Nepidae). *Journal of the New York Entomological Society* 104 (3/4): 117–215.
- Kenaga EE (1942) A new genus in the Halobatinae (Gerridae—Hemiptera). *Journal of the Kansas Entomological Society* 15 (4): 136–141.
- Manzano MR, Nieser N, Caicedo G (1995) Lista preliminar de heterópteros acuáticos en la Isla Gorgona y Llanura del Pacífico. *Biblioteca José Jerónimo Triana* 11: 47–72.
- Melin D (1929) Hemiptera from South and Central America. I. (Revision of the genus *Gelastocoris* and the American species of *Mononyx*). *Zoologiska Bidrag* 12: 151–198.
- Millspaugh DD (1939) Bionomics of the aquatic and semi-aquatic Hemiptera of Dallas County, Texas. *Field and Laboratory* 7 (2): 67–87.
- Molano-Rendón F, Camacho-Pinzón DL, Serrato-Hurtado C (2005) Gerridae (Heteroptera: Gerromorpha) de Colombia. *Biota Colombiana* 6 (2): 163–172.
- Molano-Rendón F, Mondragón SP, Morales-Castaño IT (2017a) A new species of *Rheumatobates* Bergroth (Hemiptera: Heteroptera: Gerridae) from mangroves of the Colombian Caribbean region, new records, and a key to species recorded from the country. *Zootaxa* 4277 (2): 252–260. <https://doi.org/10.11646/zootaxa.4277.2.5>
- Molano-Rendón F, Mondragón SP, Morales-Castaño IT (2017b) Nueva especie y nuevos registros de *Telmatometra* (Hemiptera: Gerridae) en Colombia. *Ciencia en Desarrollo* 8 (1): 93–98.
- Molano-Rendón F, Morales-Castaño IT, Serrato-Hurtado C (2008) Clasificación y hábitats de Gerridae (Heteroptera—Gerromorpha) en Colombia. *Acta Biológica Colombiana* 13 (2): 41–60.
- Molano-Rendón F, Moreira FFF, Morales-Castaño IT (2016) New species and records of Microveliinae and Veliinae (Hemiptera: Heteroptera: Veliidae) from Colombia. *Zootaxa* 4171 (3): 575–585. <http://doi.org/10.11646/zootaxa.4171.3.11>
- Mondragón SP, Molano-Rendón F, Morales-Castaño IT (2017) Cinco nuevas especies de *Tachygerris* (Hemiptera: Gerridae: Gerrinae) y nuevos registros para Colombia. *Caldasia* 39 (2): 204–220. <https://doi.org/10.1544/6/caldasia.v39n2.60603>
- Morales-Castaño IT, Castro-Vargas MI (2010) Nuevos registros y ampliación de distribución geográfica para especies de Gerridae (Insecta: Hemiptera) en Colombia. *Acta Biológica Colombiana* 15 (1): 271–280.
- Morales-Castaño IT, Molano-Rendón F (2008) Heterópteros acuáticos del Quindío (Colombia): los infraordenes Gerromorpha y Nepomorpha. *Revista Colombiana de Entomología* 34 (1): 121–128.
- Morales-Castaño IT, Molano-Rendón F (2009) Revisión de los géneros *Eurygerris* y *Tachygerris* (Hemiptera: Tachygerrini) para la región neotropical. *Revista Mexicana de Biodiversidad* 80: 395–410.
- Morales-Castaño IT, Rojas N, Jiménez-Ferbans L, Amat G, Devia N, Fernández F (2008) Insectos acuáticos. In: Rangel-Ch. JO (Ed) *Estudio de inventario de Fauna, Flora, Descripción Biofísica y Socioeconómica y Línea Base Ambiental de las Ciénagas de Mata de Palma y La Pachita*. Convenio Instituto de Ciencias Naturales / Universidad Nacional de Colombia, Corpocesar, Bogotá, 169–187.
- Moreira FFF, Alecrim VP, Ribeiro JRI, Nessimian JL (2011) Identification key to the Gerridae (Insecta: Heteroptera: Gerromorpha) from the Amazon river floodplain, Brazil, with new records for the Brazilian Amazon. *Zoologia* 28 (2): 269–279. <http://doi.org/10.1590/S1984-46702011000200018>
- Moreira FFF, Barbosa JF (2013) A new *Hydrometra* (Hemiptera: Heteroptera: Hydrometridae) from northeastern Brazil, with a key to the species recorded from the country. *Zootaxa* 3619 (1): 70–74. <http://doi.org/10.11646/zootaxa.3619.1.4>
- Moreira FFF, Ribeiro JRI, Nessimian JL (2006) Description of the male and the southernmost record of *Mesoveloides williamsi* Hungerford, 1929 (Hemiptera: Heteroptera: Mesovelidae). *Zootaxa* 1269: 51–56. <http://doi.org/10.5281/zenodo.173232>
- Moreira FFF, Ribeiro JRI, Nessimian JL (2008) A synopsis of the species of *Mesovelia* (Insecta: Heteroptera: Mesovelidae) occurring in the floodplain of the Amazon River, Brazil, with redescription of *Mesovelia mulsanti* White and *M. zeteki* Harris & Drake. *Acta Amazonica* 38 (3): 539–550. <http://doi.org/10.1590/S0044-596720080003000020>
- Moreira FFF, Ribeiro JRI, Nessimian JL (2009) A synopsis of the *Hydrometra* (Hemiptera, Heteroptera, Hydrometridae) from the Amazon River floodplain, Brazil, with redescription of *Hydrometra argentina* Berg. *Revista Brasileira de Entomologia* 53 (1): 69–73. <http://doi.org/10.1590/S0085-56262009000100017>
- Neering T (1954) Morphological variations in *Mesovelia mulsanti* (Hemiptera, Mesovelidae). *University of Kansas Science Bulletin* 36 (5): 125–148.
- Nieser N (1969) The Heteroptera of the Netherlands Antilles—VII Corixidae. Studies on the Fauna of Curaçao and other Caribbean Islands 28 (107): 135–164.
- Nieser N (1970) Gerridae of Suriname and the Amazon with additional records of other neotropical species. Studies on the Fauna of Suriname and other Guyanas 12 (47): 94–138.

- Nieser N (1975) The water bugs (Heteroptera: Nepomorpha) of the Guyana region. Studies on the Fauna of Suriname and other Guyanas 16 (59): 1–308 + 24 plates.
- Nieser N (1977a) A revision of the genus *Tenagobia* Bergroth (Heteroptera: Corixidae). Studies on Neotropical Fauna and Environment 12 (1): 1–56. <http://doi.org/10.1080/01650527709360510>
- Nieser N (1977b) Gelastocoridae in the Zoologisches Museum der Humboldt-Universität zu Berlin (Heteroptera). Deutsche Entomologische Zeitschrift (N.F.) 24 (4–5): 293–303.
- Nieser N, Chen PP (1992) Notes on Gelastocoridae and Ochteridae (Heteroptera) with the description of five new species. Storkia 1: 2–13.
- Nieser N, Melo AL (1997) Os Heterópteros Aquáticos de Minas Gerais: Guia Introdutório com Chave de Identificação para as Espécies de Nepomorpha e Gerromorpha. Editora UFMG, Belo Horizonte, 177 pp.
- Pacheco-Chaves B, Moreira FFF, Springer M (2014) New records of Gerromorpha (Insecta: Hemiptera: Heteroptera) from Costa Rica. Check List 10 (1): 180–186. <http://doi.org/10.15560/10.1.180>
- Padilla-Gil DN (2012) Los Hemípteros Acuáticos del Municipio de Tumaco (Nariño, Colombia): Guía Ilustrada. Editorial Universitaria - Universidad de Nariño, San Juan de Pasto, 88 pp.
- Padilla-Gil DN (2013) Nuevos registros y ampliación de la distribución de heterópteros acuáticos en Colombia (Hemiptera, Heteroptera). Acta Biológica Colombiana 18 (2): 391–400.
- Padilla-Gil DN (2015) Gerromorpha y Nepomorpha (Heteroptera) del Pacífico de Colombia: lista de especies, distribución geográfica y altitudinal. Biota Colombiana 16 (1): 20–35.
- Padilla-Gil DN (2016) Nuevos registros de Heteroptera (Hemiptera) acuáticos y semiacuáticos de Colombia. Biota Colombiana 17 (2): 39–46. <http://doi.org/10.21068/c2016.v17n02a04>
- Padilla-Gil DN, Moreira FFF (2013a) Two new species of *Microvelia* Westwood, 1834 (Hemiptera: Heteroptera: Veliidae) from Colombia, with a key to Colombian species. Zootaxa 3745 (5): 587–595. <http://doi.org/10.11646/zootaxa.3745.5.7>
- Padilla-Gil DN, Moreira FFF (2013b) Checklist, taxonomy and distribution of the *Rhagovelia* Mayr, 1865 (Hemiptera: Heteroptera: Veliidae) of the Americas. Zootaxa 3640 (3): 409–424. <http://doi.org/10.11646/zootaxa.3640.3.5>
- Padilla-Gil DN, Nieser N (1992) Nueva especie del género *Buenoa* Kirkaldy (Hemiptera, Notonectidae) con clave para especies y notas ecológicas. Agronomía Colombiana 9 (1): 74–84.
- Perez-Gelabert DE, Floriano CFB (2016) New records of the water strider *Platyvelia brachialis* (Stål 1860) (Hemiptera: Heteroptera: Veliidae) from the Dominican Republic and Haiti, with a checklist of the West Indian Veliidae. Proceedings of the Entomological Society of Washington 118 (3): 471–476. <http://doi.org/10.4289/0013-8797.118.3.471>
- Pizano C, García H (2014) El Bosque Seco Tropical en Colombia. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá, 349 pp.
- Polhemus DA (1997) Systematics of the Genus *Rhagovelia* Mayr (Heteroptera: Veliidae) in the Western Hemisphere (exclusive of the *angustipes* complex). Entomological Society of America, Lanham, 385 pp.
- Polhemus JT (1977) Type-designations and other notes concerning Veliidae (Insecta: Hemiptera). Proceedings of the Entomological Society of Washington 79 (4): 637–648.
- Polhemus JT, Polhemus DA (2002) The Trepobatinae (Gerridae) of New Guinea and surrounding regions, with a review of the world fauna. Part 6. Phylogeny, biogeography, world checklist, bibliography and final taxonomic addenda. Insect Systematics & Evolution 33: 253–290. <https://doi.org/10.1163/187631202X00154>
- Polhemus JT, Spangler PJ (1989) A new species of *Rheumatobates* Bergroth from Ecuador and distribution of the genus (Heteroptera: Gerridae). Proceedings of the Entomological Society of Washington 91 (3): 421–428.
- Roback SS, Nieser N (1974) Aquatic Hemiptera (Heteroptera) from the Llanos of Colombia. Proceedings of the Academy of Natural Sciences of Philadelphia 126: 29–49.
- Rodríguez-M GM, Banda-R. K, Reyes-B. SP, Estupiñán-González AC (2012) Lista comentada de las plantas vasculares de bosques secos prioritarios para la conservación en los departamentos de Atlántico y Bolívar (Caribe colombiano). Biota Colombiana 13 (2): 7–39. <http://doi.org/10.15472/lugrbm>
- Todd EL (1955) A taxonomic revision of the family Gelastocoridae (Hemiptera). University of Kansas Science Bulletin 37 (11): 277–475.
- Todd EL (1961) A checklist of the Gelastocoridae (Hemiptera). Proceedings of the Hawaiian Entomological Society 17 (3): 461–476.
- Torre-Bueno JR de la (1926) The family Hydrometridae in the Western Hemisphere. Entomologica Americana (N.S.) 7 (2): 83–128.
- Truxal FS (1953) A revision of the genus *Buenoa* (Hemiptera Notonectidae). University of Kansas Science Bulletin 35 (11): 1351–1523.
- Williams J, Read C, Norton A, Dovers S, Burgman M, Proctor W, Anderson H (2001) Biodiversity, Australia State of the Environment Report 2001. Department of the Environment and Heritage, Canberra, 130 pp.